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ABSTRACT

The purpose of this study was to determine the effectiveness of the Multi-Ethnic Information Feedback System (MIFS) on the reading and arithmetic achievement of fifth grade pupils. Consisting of an objective referenced test-item and a computer feedback system MIFS enabled teachers to continually measure student performance and evaluate the effectiveness of their own instruction. It was expected that these activities would influence student achievement. The results of the data analysis indicated that the program significantly increased reading and arithmetic achievement. (Author)

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EFFECTIVENESS OF AN ESAA FUNDED INFORMATION FEEDBACK SYSTEM ON THE READING AND ARITHMETIC ACHIEVEMENT OF BLACK AND WHITE FIFTH GRADE PUPILS

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During the 1973-74 school year Norfolk Public Schools, with ESAA Title VII Pilot Grant funding, implemented the Multi-Ethnic Information Feedback System (MIFS). MIFS was attempted as an approach to raising the achievement level of minority students.

Consisting of a locally developed objective referenced test item bank and a computer feedback system, MIFS enabled fifth grade teachers to measure student performance and evaluate the effectiveness of their own instruction. MIFS was designed to measure pupil competency on reading and arithmetic objectives. As reading and arithmetic behavioral objectives were isomorphic with the MIFS item bank, teachers were able to identify the needs of their pupils.

Items from the item bank were used to construct two types of tests. Monitor tests measured a large number of either reading or arithmetic objectives, one item per objective. Teachers were able to detect changes in group performance on all objectives. Unit tests were designed to measure each pupil's competency on a particular objective. As each objective was measured by five items, teachers were able to determine whether a student had mastered a specific objective.

Both types of tests were machine scored, the results being returned to teachers in the form of various computer reports. The Group Summary Report indicated the performance level of classes on each objective. The Teacher Summary Report presented the test results of each student for each testing. By inspecting the Student Report pupils identified their own academic strengths and weaknesses. It was expected that this type of information would enable teachers and students to concentrate their efforts on ameliorating weaknesses in reading and arithmetic.

METHOD

MIFS was implemented in five large city elementary schools. Five additional schools were selected at random to form a control group. A 2 x 2 factorial nonequivalent control group design was used in the project evaluation. The independent variables were (1) participation or non-participation in the information feedback system and (2) the race of subjects. The dependent variables were reading and arithmetic achievement as measured by locally developed tests. The items on these tests were random selections from the MIFS item bank. The 50 item reading test and 49 item arithmetic test had reliabilities (KR-21) of .89 and .83, respectively.

RESULTS

Post-test scores minus pre-test scores were taken to calculate each pupil's difference score. Difference score means for reading and arithmetic appear in Table 1.

TABLE 1

READING AND ARITHMETIC MEAN DIFFERENCE SCORES ($\bar{X}$): TREATMENT BY RACE

	READING		MATH	
GROUP	N	$\bar{X}$	N	$\bar{X}$
MIFS-WHITE	100	3.13	148	4.51
MIFS-BLACK	240	4.64	228	4.94
CONTROL-WHITE	156	2.34	167	3.86
CONTROL-BLACK	222	2.48	234	3.31

Reading and arithmetic difference scores were analyzed separately using a 2 x 2 ANOVA. Analysis of reading scores, Table 2, revealed that both the main effects of treatment and race were significant at the .05 level.

TABLE 2

ANALYSIS OF VARIANCE OF READING DIFFERENCE SCORES: TREATMENT BY RACE

SOURCE	DF	SS	MS	F
TREATMENT	1	501.48	501.48	17.10
RACE	1	149.81	149.81	5.11
TREATMENT X RACE	1	75.91	75.91	2.58
ERROR	714	20930.94	29.31	

Inspecting the means indicated that treatment group scores were significantly higher than control group scores. Within the treatment group, the mean score of blacks was significantly higher than whites.

An analysis of arithmetic difference scores, Table 3, indicated that the treatment effect was significant at the .05 level. Inspecting the means revealed that the treatment group's math scores were higher than control group scores.

TABLE 3

ANALYSIS OF VARIANCE OF
ARITHMETIC DIFFERENCE SCORES;
TREATMENT BY RACE

SOURCE	DF	SS	MS	F
TREATMENT	1	293.24	293.24	7.66
RACE	1	0.50	0.50	0.013
TREATMENT X RACE	1	44.98	44.98	1.117
ERROR	773	29574.94	38.25	

Comparing the ratio of the difference between MIFS and control group mean difference scores and the total group standard deviation revealed an effect size of .323 for reading and .20 for arithmetic. At this time, it appears that the Multi-Ethnic Information Feedback System will be extended to all fifth grade classes in the Norfolk Public Schools.